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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ERIC M. MONROE

Appeal 2008-0683
Application 09/982,061
Technology Center 2100

Decided: July 31, 2008

Before JAMES D. THOMAS, JAY P. LUCAS and
THU A. DANG, *Administrative Patent Judges*.

DANG, *Administrative Patent Judge*.

DECISION ON APPEAL

I. STATEMENT OF CASE

Appellant appeals under 35 U.S.C. § 134 from a final rejection of claims 1-22. We have jurisdiction under 35 U.S.C. § 6(b).

A. INVENTION

According to Appellant, the invention relates to systematically translating field temperature conditions associated with particular packages/products into accelerated life testing requirements based on a pre-determined set of design use inputs, consumer behavior patterns, and environmental field conditions (Spec. 1, ll.7-10).

B. ILLUSTRATIVE CLAIM

Claim 1 is exemplary and is reproduced below:

1. A computer-implemented method, tangibly embodied on a computer readable storage medium, which when executed will quantify the reliability test requirements of a package/chip device over a product lifetime comprising:

modeling a plurality of different types of ambient and power-driven temperature cycle fluctuations the package/device is expected to undergo over the product lifetime; and

determining the accelerated life test requirements that represent each of the plurality of different types of temperature cycle fluctuations.

C. REJECTIONS

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Mencinger, Nicholas P., "A Mechanism-Based Methodology for Processor Package Reliability Assessments," Intel Technology Journal Q3, 2000, pp. 1-8.

Doty, Hatt, "Application Specific Semiconductor Device Qualification Methodology," HDP User Group International, Inc., February 1998.

ReliaSoft's Alta 1.0, "On site Training Guide," 1999.

Dellin, Ted, "Semiconductor Device Reliability Failure Models," Sematech International 2000, pp. 1-27.

Claims 1-5 and 16 stand rejected under 35 U.S.C. § 103(a) over the teachings of Mencinger and Doty;

Claims 6-12, 14, and 17-22 stand rejected under 35 U.S.C. § 103(a) over the teachings of Mencinger, Doty, and ReliaSoft; and

Claims 13 and 15 stand rejected under 35 U.S.C. § 103(a) over the teachings of Mencinger, Doty, ReliaSoft, and Dellin.

We affirm.

II. ISSUES

The issues are whether Appellant has shown that the Examiner erred in finding that

A. Claims 1-5 and 16 are unpatentable under 35 U.S.C. § 103(a) over the teachings of Mencinger and Doty.

B. Claims 6-12, 14, and 17-22 are unpatentable under 35 U.S.C. § 103(a) over the teachings of Mencinger, Doty, and ReliaSoft.

C. Claims 13 and 15 are unpatentable under 35 U.S.C. § 103(a) over the teachings of Mencinger, Doty, ReliaSoft, and Dellin.

III. FINDINGS OF FACT

The following Findings of Fact (FF) are shown by a preponderance of the evidence.

Appellant's Invention

1. In Appellant's invention, the accelerated life model includes equations known in the art such as the Coffin-Manson model, which iteratively derives point estimates of the number of accelerated test cycles required to approximate the temperature profile of the product (Spec. 5, ll. 8-17).

2. In a modified model, the number of accelerated reliability cycles required to accurately model the temperature profile of the package/chip device is equivalent to a sum of 1) the number of accelerated test cycles required to separately model temperature fluctuations due to storage cycles, 2) the number of accelerated test cycles required to separately model temperature fluctuations due to shipping cycles; and 3) the number of accelerated test cycles required to separately model power cycle fluctuations including on/idle, application use (Spec. 10, ll. 14-27).

Mencinger

3. Mencinger discloses a mechanism-based methodology for processor package reliability assessment which requires that every failure mechanism be modeled against life with the appropriate physical model (pg. 2, col. 1, ll. 5-7).

4. Environments are linked to appropriate accelerated tests. Equivalent use condition and lifetime models are used with acceleration models to define the accelerated stress durations for each failure mechanism discovered during development, the use condition including "short duration extreme ambient temperature exposures during shipping and transport," "fast processor On/off power cycles," "operating air temperature range," "maximum sustained storage temperature," and "minimum sustained storage temperature" (pg. 4, col. 1; Table 2).

5. In an example, the failure mechanisms are related through a power law relationship (Coffin-Manson) to an end-user environment (pg. 4, col. 2).

Doty

6. In Doty, the use environment determines tests, conditions and durations (Slide 2). The method includes 1) defining user environments, 2) developing list of accelerated tests/conditions, 3) relating acceleration factors to appropriate tests, 4) quantifying the temperature fluctuation from the environment, and 5) calculating conditions for each standard application (slide 4).

7. The use environment in the four phases is established, including the first storage/transportation phase, the assembly phase, the second storage/transportation phase, and the operational life phase, wherein a list of different types of ambient/non-ambient temperature fluctuations is developed (slide 3).

IV. PRINCIPLES OF LAW

"Section 103 forbids issuance of a patent when 'the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.'" *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1734 (2007).

The Supreme Court emphasized "the need for caution in granting a patent based on the combination of elements found in the prior art," and discussed circumstances in which a patent might be determined to be obvious. *KSR,* 127 S. Ct. at 1739 (citing *Graham v. John Deere Co.*, 383 U.S. 1, 12 (1966)). The Court reaffirmed principles based on its precedent that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *Id.* The operative question in this "functional approach" is thus "whether the improvement is more than the predictable use of prior art elements according to their established functions." *Id.* at 1740.

"Under the correct analysis, any need or problem known in the field and addressed by the patent can provide a reason for combining the elements in the manner claimed." *Id.* at 1742. The Court noted that "[c]ommon sense teaches . . . that familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle." *KSR*, 127 S. Ct. at 1742. "A person of ordinary skill is also a person of ordinary creativity, not an automaton." *Id.*

One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986).

In the absence of separate arguments with respect to claims subject to the same rejection, those claims stand or fall with the claim for which an argument was made. *See In re Young,* 927 F.2d 588, 590 (Fed. Cir. 1991). *See also* 37 C.F.R. § 41.37(c)(1)(vii)(2004).

V. ANALYSIS

Claims 1-5

Appellant does not provide separate arguments with respect to the rejection of claims 1-5. Therefore, we select independent claim 1 as being representative of the cited claims. 37 C.F.R. § 41.37(c)(1)(vii).

Appellant argues that "Mencinger does not disclose, or even suggest, determining accelerated life test requirements that represent ***each*** of a

plurality of different types of temperature cycle fluctuations a package/device is expected to undergo ***over the product lifetime***, as recited by claim 1" (App. Br. 5). Appellant adds that "Doty simply refers to an application-specific semiconductor qualification methodology in which certain stress conditions are provided that refer to temperature cycle fluctuations for only one application phase, namely, the ***operation life phase***, but not in ***each*** of the four application phases (App. Br. 6).

We disagree. We generally agree with the Examiner's finding that Mencinger and Doty disclose the claimed elements on appeal beginning at page 4 of the Answer and the Examiner's corresponding responsive arguments at page 18 of the Answer.

Mencinger discloses modeling failure mechanism against life with the appropriate physical model, wherein the failure mechanisms are related through the Coffin-Manson relationship to an end-user environment linked to appropriate accelerated tests (FF 3-5). In Mencinger, equivalent use condition and lifetime models are used with acceleration models to define the accelerated stress durations for each failure mechanism discovered during development, the use condition including "short duration extreme ambient temperature exposures during shipping and transport," "fast processor On/off power cycles," "operating air temperature range," "maximum sustained storage temperature," and "minimum sustained storage temperature" (FF 4). We agree with the Examiner that "Mencinger teaches determining accelerated life test requirements" and "[t]herefore teaching

each of different types of temperature cycle fluctuations" (Ans. 18). In fact, Appellant's invention sets forth that the different types of fluctuations the product undergoes include the temperature fluctuations due to storage, the temperature fluctuations due to shipping cycle, and power cycle fluctuations including on/idle, application use (FF 2).

Doty discloses establishing use environment to determine tests, conditions and durations in the four phases over the product's lifetime, which includes defining user environments, developing list of accelerated tests/conditions, relating acceleration factors to appropriate tests, and quantifying the temperature fluctuation from the environment (FF 6-7). We agree with the Examiner's finding that "Doty also like Mencinger teaches each of a plurality of different types of temperature cycle fluctuations a package/device is expected to undergo over a product lifetime" (Ans. 19), and that the accelerated tests/conditions are determined accordingly.

Though Appellant appears to be arguing that Mencinger alone "does not disclose, or even suggest, determining accelerated life test requirements that represent ***each*** of a plurality of different types of temperature cycle fluctuations a package/device is expected to undergo ***over the product lifetime***" (App. Br. 5), the Examiner has rejected the claims based on the combination of Mencinger and Doty, and nonobviousness cannot be shown by attacking the references individually. According to the Examiner's findings as discussed above, in both Doty and Mencinger, different types of fluctuations the product is expected to undergo over the product's lifetime

are determined, and the accelerated tests/conditions are then determined accordingly. We agree with the Examiner that combined teachings of Mencinger and Doty of using the Coffin-Manson model in relation with use condition to define the accelerated stress durations for each failure mechanism over the four phases of the product's lifetime to be "determining the accelerated life test requirements that represent each of the plurality of different types of temperature cycles fluctuations" a package/device is expected to undergo over the product lifetime as recited in claim 1. In fact, Appellant admits using the well-known Coffin-Manson model as the accelerated life model to iteratively derive point estimates of the number of accelerated test cycles required to approximate the temperature profile of the product (FF 1).

Though Appellant argues that the stress conditions in Doty "refer to temperature cycle fluctuations for only one application phase, namely, the ***operation life phase***, but not in ***each*** of the four application phases" (App. Br. 6), the Examiner found that Doty does consider temperature or power cycle fluctuations of other non-operational phases (Ans. 19-21). In the Reply Brief, Appellant provides no argument to dispute that the Examiner has correctly shown where this claimed element appears in the prior art.

In the Reply Brief, Appellant argues that "the Answer cites to and relies upon unrelated portions of both Mencinger and Doty as evidence of the different types of temperature cycle fluctuations these references allegedly disclose—but none of the cited portions of Mencinger and Doty

discuss the alleged different types of temperature cycle fluctuations in the context of determining accelerated life test requirement" (Reply Br. 3). Again, Appellant appears to be arguing that individually Mencinger and Doty do not disclose the claimed invention when the Examiner has rejected the claims based on the combination of Mencinger and Doty.

As discussed above, both Mencinger and Doty are directed to determining accelerated test requirements in view of fluctuations a product undergoes over the product's lifetime. We agree with the Examiner's finding that the combination of Mencinger's teachings with Doty's teachings results in the claimed invention of using temperature or power cycle fluctuations for determining accelerated life test requirements in operational and non-operations phases over the product's lifetime.

Appellant further argues that the combination of teachings of Mencinger with those of Doty is improper because "the proper evidence of obviousness must show why there is a suggestion to combine the references" (App. Br. 8).

The Examiner's finding of motivation to combine beginning at page 5 of the Answer and the Examiner's corresponding responsive arguments at page 22 of the Answer comply with the requirements of the above-noted case law. We agree with the Examiner's finding that "Doty and Mencinger are solving the same nature of the problem as would be easily recognized by a person skilled in the art" (Ans. 22).

Appellant has provided no evidence that incorporating Doty's testing over four application phases in a product's lifetime to Mencinger's testing over a product's lifetime was "uniquely challenging or difficult for one of ordinary skill in the art," *Leapfrog*, 485 F.3d 1153, 1162 (Fed. Cir. 2007), nor has Appellant presented evidence that this incorporation yielded more than expected results. Rather, Appellant's invention is simply an arrangement of the known teaching of testing in four phases in a testing system. Thus, it is our view that a person of ordinary skill would have been able to fit such teachings of Mencinger and Doty together like pieces of a puzzle since a person of ordinary skill is also a person of ordinary creativity, not an automaton. *See KSR* at 1742.

Accordingly, we conclude that the Appellant has not shown that the Examiner erred in rejecting claims 1, and claims 2-5, falling with claim 1, under 35 U.S.C. § 103(a).

Claim 16

As to claim 16 which Appellant admits "recites features essentially analogous to claim 4," Appellant provides the same argument as to claim 4 and adds the argument that "claim 16 further recites quantifying frequencies and magnitudes of temperature fluctuations based in part of the shipping route taken by the product" which differs from the teachings of Doty because "the seasonal temperature variations referred to by Doty involve an overall trending of the temperature data occurring over a long period of time,

rather than an immediate impact as would be expected by the product taking a different route" (App. Br. 9).

We find no deficiencies regarding Mencinger and Doty, as discussed above regarding claims 1-5. Claim 4 has not been separately argued. Furthermore, the Examiner found that the *combination* of Mencinger and Doty discloses such shipping route limitation, and that Mencinger, particularly, shows "short duration extreme ambient temperature exposures during shipping and transportation" (Ans. 25).

In the Reply Brief, Appellant provides no argument to dispute that the Examiner has correctly shown where this claimed element appears in both Doty and Mencinger, and nonobviousness cannot be shown by attacking Doty individually. Therefore, we conclude that Appellant has not shown that the Examiner erred in rejecting claim 16 under 35 U.S.C. § 103(a) over Gibbon.

Claims 6-12, 14 and 17-22

As to claims 6-12, 14 and 17-22, Appellant provides the same argument as claims 1, 4 and 16, and add the argument that "ReliaSoft does not cure the critical deficiencies of the Mencinger and Doty references" and that "there exists no express motivation in any of the references to combine them" (App. Br. 10).

The Examiner's finding of motivation to combine beginning at page 10 of the Answer and the Examiner's corresponding responsive arguments

beginning at page 28 of the Answer comply with the requirements of the above-noted case law.

We find no deficiencies regarding Mencinger and Doty, as discussed above regarding claim 1, 4, and 16. We agree with the Examiner's finding that the references "are solving the same nature of the problem as would be easily recognized by a person skilled in the art" (Ans. 29) since a person of ordinary skill is also a person of ordinary creativity, not an automaton. *See KSR* at 1742.

Therefore, we conclude that Appellant has not shown that the Examiner erred in rejecting claims 6-12, 14 and 17-22 under 35 U.S.C. § 103(a) over Mencinger, Doty, and ReliaSoft.

Claims 13 and 15

As to claims 13 and 15, Appellant provides the same argument as claims 1 and 9 from which they depend, and adds the argument that taking the teaching of a Coffin Manson model as described in Dellin and use with the teachings of Mencinger, Doty, and ReliaSoft "is mere hindsight" (App. Br. 10).

The Examiner's finding of motivation to combine beginning at page 15 of the Answer and the Examiner's corresponding responsive arguments at page 30 of the Answer comply with the requirements of the above-noted case law.

We find no deficiencies regarding Mencinger, Doty, and ReliaSoft as discussed above. Claim 9 has not been separately argued. Furthermore, we agree with the Examiner's finding that Mencinger, Doty, and Reliasoft are "analogous art" to Dellin (Ans. 30), since Mencinger also discloses the use of the Coffin-Manson model (FF 5). We thus agree with the Examiner that the "nature of problem to be solved is common to both Dellin and Mencinger" (Ans. 30). It is our view that a person of ordinary skill would have been able to combine such analogous teachings to solve the common problem without mere hindsight.

Therefore, we conclude that Appellant has not shown that the Examiner erred in rejecting claims 13 and 15 under 35 U.S.C. § 103(a) over Mencinger, Doty, ReliaSoft, and Dellin.

CONCLUSION OF LAW

(1) Appellant has not shown that the Examiner erred in finding that claims 1-5 and 16 are unpatentable under 35 U.S.C. § 103(a) over the teachings of Mencinger and Doty.

(2) Appellant has not shown that the Examiner erred in finding that claims 6-12, 14, and 17-22 are unpatentable under 35 U.S.C. § 103(a) over the teachings of Mencinger, Doty, and ReliaSoft.

(3) Appellant has not shown that the Examiner erred in finding that claims 13 and 15 are unpatentable under 35 U.S.C. § 103(a) over the teachings of Mencinger, Doty, ReliaSoft, and Dellin.

(4) Claims 1-22 are not patentable.

DECISION

The Examiner's rejection of claims 1-22 under 35 U.S.C. § 103(a) is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

pgc

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